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Space Station Is Studied By Military

Defense ideas abound in midst of debate over station's future.

By WILLIAM J. BROAD

THE Pentagon is eyeing NASA's proposed space station for a bevy of projects and missions that would propel the Department of Defense into a new era of space operations in the 21st century. The military's vision, while offering a new source of political support for the embattled space agency, also promises to heat the simmering controversy over plans for a manned station in space.

According to a study prepared for the Air Force and a study proposal by the Army, the station might be used as a fueling depot for "Star Wars" weapons, a staging area for reconnaissance and battle management and a service station for repairing arms and turning space junk into decoys and armor. The station is also seen as pioneering new technologies for use throughout the Pentagon's array of space programs.

Early in the next century, manned military operations in orbit might be so extensive that they would require an altogether new space station of their own, according to the studies.

The military has publicly expressed little affection for a space station but has said it wants to keep its options open. The proposals growing out of these studies are the most detailed look yet at what those options might be.

These proposals, made public recently, come amid rising discord over the goals and fate of NASA's proposed station. Some members of Congress have blanched at the price of the station and questioned its usefulness for civilian science. Last week, in a bid to reduce political opposition, President Reagan approved a scaled-down version, cutting its $14.5 billion price by more than $2 billion.

The military's possible role has also touched off controversy. Negotiations on participation by Japan, Europe and Canada broke down briefly last December when the Pentagon insisted that any agreement permit military use. Although talks have resumed, no accord has yet been reached.

In Congress, Norman Y. Mineta, a California Democrat who is a member of the House space committee, recently introduced a bill that would prohibit military use of the station. "NASA's credibility is at risk," he said. "I am concerned that the space agency, once a leader in scientific research and development, will become nothingmore than a transit system for the Defense Department."

Pentagon officials dismiss such charges, saying the current work involves only studies, not plans, and pointing out that the Soviet military has worked on space stations for more than 15 years.

They add, however, that the demands of national security require that the military consider all possible options and strategies. "We are taking a hard look at the role of military man in space," Gen. Robert T. Herres of the Air Force, who was recently appointed vice chairman of the Joint Chiefs of Staff, told an aerospace conference in January. General Herres, who was head of the United States Space Command when he spoke at the session, listed such potential goals as "on-orbit servicing and the repair of space systems."

Original Goal of Program

The space station was originally seen as a permanent manned base for civilian research and as a staging area for expeditions to the Moon and planets. In his 1984 State of the Union Message, President Reagan endorsed the project and urged its development within a decade. "We can follow our dreams to distant stars, living and working in space for peaceful, economic and scientific gain," he said.

As the military issue flared this year, James C. Fletcher, administrator of the National Aeronautics and Space Administration, ruled out the deployment of weapons on board the station but said the Pentagon could conduct research.

Dozens of ways the military might, if allowed, work in and around NASA's space station are outlined in a thick study recently conducted by the American Institute of Aeronautics and Astronautics, a New-York based industry association, for the Air Force Space Technology Center at Kirtland Air Force Base in Albuquerque, N.M. The study concluded the station would be ideal for conducting a battery of missions but noted that great technological strides would have to be made if the station were to realize its full military potential.

"The Air Force is just starting to understand what they have to do to operate out of space," said Frank Redd, chairman of the study, who is an assistant director of the Center for Space Engineering at Utah State University at Logan. "We tried to identify the technologies that would have to be developed."

The institute's study was carried out by contractors deeply involved in developing NASA's space station, including McDonnell Douglas, Martin Marietta, Grumman Aerospace, Lockheed Missiles and Space, Rockwell International, Aerospace Corporation, and Ball Aerospace.

Deployment Expected in 1990's

The Air Force particularly asked them to consider the maintenance needs of Mr. Reagan's "Star Wars" anti-missile plan, officially known as the Strategic Defense Initiative. Its operation could take thousands of computers, sensors and weapons working in unison to shoot down enemy missiles. The Pentagon expects to begin deployment of components in the mid-1990's, just as the space station goes into operation, with full "Star Wars" deployment taking up to 5,000 launchings of the space shuttles or shuttle-size rockets.

A prime use of the space station would be as a depot for fueling military satellites, transport vehicles and "Star Wars" battle stations with hard-to-handle, super-cooled propellants, the study said. "Fluid quantities from thousands to hundreds of thousands of pounds will be required in the next 20 years for propulsion, power, life support, laser reactants, nuclear particle beams and similar types of systems," it said.

To achieve fueling goals in the harsh, weightless void of space, much headway will have to be made in such areas as tank insulation, "slosh control"

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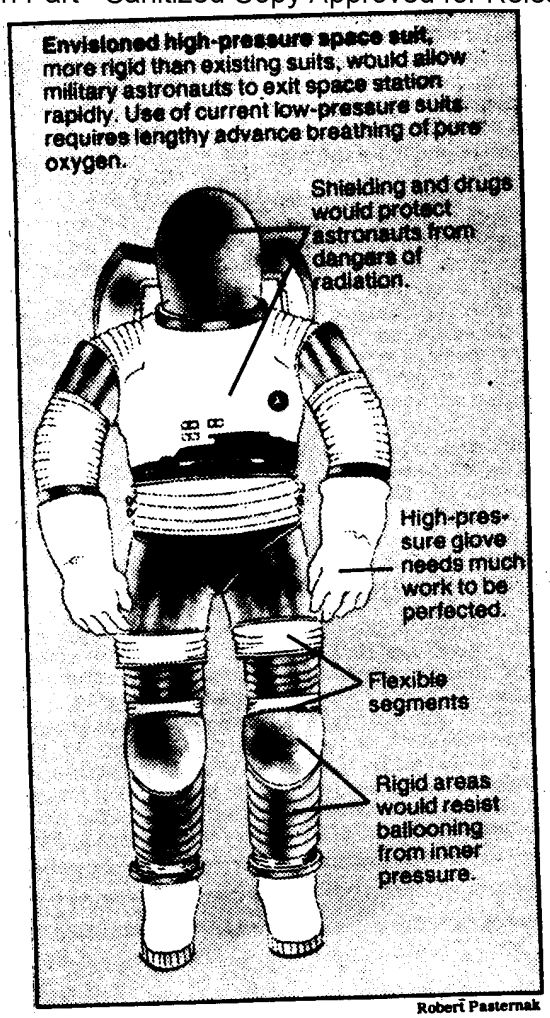

and the mechanics of fuel transfer and resupply, the study found. It called for $100 million to be spent over the next seven years to perfect the handling of fluids.

"Most people don't think much about it, and if they do they think we have all the technology," said Ralph Eberhardt, an engineer at Martin Marietta who participated in the study. "Fluids are very important and are strongly tied to the notion that the space station is a transportation node, like a service station." He added that refueling would dramatically cut the cost of basing an object in space. "Resupply means you don't throw it away" once a tank runs dry, he said.

Another way to cut costs and raise the effectiveness of space-based military devices is to repair them. The study found this especially true for "Star Wars" systems that would orbit for decades. Space weapons, it said, "may not be feasible unless they can be maintained on-orbit to assure their proper operation and availability." In particular, it said military astronauts could act as "repairmen" for kinetic-energy weapons, small homing rockets meant to destroy targets by smashing into them. These devices are proposed to be the first "Star Wars" weapons deployed in space. The Pentagon wants to orbit about 3,000 of them.

Turning Junk Into Shields

A more challenging job would be to turn space junk into decoys and shields to protect space weapons. This too would cut costs, the study found, "since very pound of weight taken into orbit has been paid for." An example, it suggested, would be to salvage the huge external fuel tanks from flights of the space shuttles for military purposes. The tanks usually burn up as they fall back to earth.

Achieving the goals of refueling, repair and salvage could require many hours in space by astronauts, raising a host of hurdles, the study found. A key challenge is to protect astronauts from dangers posed by solar flares and cosmic rays. The study noted that "drugs to prevent and [illegible] the effects of radiation may be forthcoming." It said, "The major advantages of these is that they are nonencumbering, are not weight restrictive and are less costly than shielding."

For rapid egress of astronauts into space, the study also called for the development of high-pressure spacesuits that would eliminate the long periods of breathing pure oxygen NASA astronauts must now undergo. The routine, which can take hours, prevents nitrogen from fatally bubbling in their blood when they leave their pressurized cabins for the lower pressures of regular spacesuits. Rapid egress could prove crucial for military operations, the study said.

The group called for $1.8 billion to be spent over the next two decades to develop high-pressure suits, radiation protections, advanced crew vehicles, and work stations where astronauts could refuel, repair and salvage military equipment.

The study also foresaw a spectrum of man-made threats to space stations and other military platforms, including attacks by lasers, particle beams, kinetic-energy weapons, and nuclear bombs, which if exploded in space radiate dangerous levels of X-rays over thousands of miles. To counter them, it called for the investigation of decoys, shielding, spares and defensive arms. "Nuclear shields based upon X-ray absorbing materials carried in lightweight overlays have been developed for missile systems but adaptability for spacecraft requires further work," it noted.

Military use of NASA's space station might evolve in phases, the study suggested. At first, military astronauts, working in a NASA laboratory module, would perfect technologies for a variety of Defense Department missions in space. "The NASA space station will provide an ideal laboratory," it noted, warning that "security provisions" might "cause problems with currently planned experiments and international users." Security devices and plans, it estimated, would cost $1 billion.

In the next phase, a fuel depot would be established near the NASA station. In the third phase, "dedicated laboratory-type modules could be developed to totally service military needs along with habitat modules in which to quarter the military personnel." It estimated that the cost of the second and third phases would be $5 billion.

Finally, an altogether new space station could be dedicated to the military early in the next century. If such a facility were built, the study suggested, it should follow along NASA lines, enabling "faster development and considerable cost savings." It estimated that the cost would be $3.5 billion.

Military Space, an industry newsletter published in Arlington, Va., which first carried news of the study, said recently that the Air Force was "digesting" the report and that its current interest in NASA's space station seemed to be confined to unspecified experiments.

Military Aims Proposed

However, a rival service has begun to outline a specific military goal. Army spy satellite experts are eyeing the NASA space station, or military versions of it, as a base for directing battles from orbit, according to an Army proposal seeking industry studies. The aim would be to improve reconnaissance and targeting of weapons. According to Space Business News, a newsletter published in Arlington, Va., the Army's Engineer Topographic Laboratories at Fort Belvoir, Va., prepared a request for proposals to conduct design studies, but the Army bureaucracy canceled the idea for lack of financing. The Army said it might go ahead with the study next year if Congress allocated enough money.

But in light of growing opposition by some members of Congress to the military's role in the space station, such financing might be difficult to achieve. Senator Donald W. Riegle Jr., a Michigan Democrat who heads a key subcommittee on space, recently voiced concern over the military's expanding role in space and singled out the station as a way for Congress to reaffirm NASA's original goal. "The space station," he said, "is a test of our commitment to a civilian space program."